### PATENT COOPERATION TREATY

MATTHEW B. DERNIER KAPLAN & GILMAN, L.L.P. 900 ROUTE 9 NORTH, SUITE 104 WOODBRIDGE, NJ 07095  Applicant' s or agent' s file reference  POR FURTHER ACTION  See paragraph 2 below  POR FURTHER ACTION  See paragraph 2 below  Priority date (day/month/year)  Priority date, vibra day-day-day-day-day-day-day-day-day-day-	INTERNATIONAL SEARCHING AUTHO	DRITY		
Applicant's or agent's file reference  FOR FURTHER ACTION  International application No.  International filing date (day/month/year)  Distormational application No.  International filing date (day/month/year)  Distormational patient Classification (IPC) or both national classification and IPC  IPC: GoK 9154  USPC: 382/302  Applicant  NEW JERSEY INSTITUTE OF TECHNOLOGY   1. This opinion contains indications relating to the following items:  Box No. I Basis of the opinion  Box No. IV Care and of the priority  Box No. IV Lack of unity of invention  Box No. VR easoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability inventive step of industrial applicability of the control of the priority of the	MATTHEW B. DERNIER KAPLAN & GILMAN, L.L.P. 900 ROUTE 9 NORTH, SUITE 104		WD	
Applicant's or agent's file reference  436/10 PCT  International application No.  International filing date desymonth/year)  PCT/USO4/40442  03 December 2004 (03.12.2004)  International Patent Classification (IPC) or both national classification and IPC  IPC: G06K 9/54  USPC: 382/302  Applicant  NEW JERSEY INSTITUTE OF TECHNOLOGY  1. This opinion contains indications relating to the following items:  Box No. I Basis of the opinion  Box No. II Priority  Box No. IV Lack of unity of invention  Box No. IV Lack of unity of invention  Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability: citations and explanations supporting such statement  Box No. VI Certain documents cited  Box No. VII Certain decuments cited  Box No. VIII Certain descriptions on the international application  Box No. VIII Certain observations on the international application  Box No. VIII Certain observations on the international application  If a demand for international preliminary Examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examinating Authority ('TPEA') except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the international Bureau under Rule 66.1bis by that written opinions of this International Searching Authority will not be so considered.  If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA as written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 to before the expiration of 22 months from the priority date, whichever expires later.  For further opticas, see Form PCT/ISA/220.  3. For further opticas, see Form PCT/ISA/220.  1. Determational Preliminary Paramining Authority of International Preliminary Paramining County will not be so considered.  Box No. VIII Ce	WOODBRIDGE, NJ 07095			
Applicant's or agent's file reference  436/10 PCT  International application No.				(PCT Rule 43bis.1)
A35/10 PCT   International application No.   International filing date (day/month/year)   Priority date (day/month/year)   Priority date (day/month/year)   O3 December 2004 (03.12.2004)   O5 December 2003 (05.12.2003)	Applicant's or agent's file reference		(day/month/year)	13 FEB 2007
International application No.  PCT/US04/40442  O3 December 2004 (03.12.2004)  D5 December 2003 (05.12.2003)  International Patent Classification (IPC) or both national classification and IPC  PC: G6K9 /54 USPC: 382/302  Applicant  NEW JERSEY INSTITUTE OF TECHNOLOGY  1. This opinion contains indications relating to the following items:  Box No. I Basis of the opinion  Box No. II Priority  Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability  Box No. IV Leck of unity of invention  Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement  Box No. VI Certain documents cited  Box No. VII Certain documents cited  Box No. VIII Certain observations on the international application  2. FURTHER ACTION  If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPBA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPBA and the chosen IPBA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.  If this opinion is, as provided above, considered to be a written opinion of the IPBA, at the Authority of Form PCT/ISA/220.  If this opinion is, as provided above, considered to be a written opinion of the international from the date of mailing of Form PCT/ISA/220.  Searching Authority and the explanation of 22 months from the priority date, whichever expires later.  For further details, see notes to Form PCT/ISA/220.  Name and mailing address of the ISA/ US  Mail Stop PCT, Attn: ISA/US  Mail Stop PCT, Attn: ISA/US  Mail Stop PCT, Attn: ISA/US  Alexandria, Virginia 22313-1450				·
PCT/USO4/40442  O3 December 2004 (03.12.2004)  International Patent Classification (IPC) or both national classification and IPC  IPC: G96K 9/54  USPC: 362/302  Applicant  NEW JERSEY INSTITUTE OF TECHNOLOGY  1. This opinion contains indications relating to the following items:  Box No. I Basis of the opinion  Box No. II Priority  Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability  Box No. IV Lack of unity of invention  Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement  Box No. VI Certain documents cited  Box No. VII Certain documents cited  Box No. VIII Certain observations on the international application  2. FURTHER ACTION  If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPBA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPBA and the chosen IPBA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.  If this opinion is, as provided above, considered to be a written opinion of the IPBA, the applicant is invited to submit to the IPBA are written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCTI/SA/220.  Name and mailing address of the ISA/ US  Mail Stop PCT, Attn: ISA/US  Deter of completion of this  Deter 2006 (1		Y-4	1	
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Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450  Mail Stop PCT, Attn: ISA/US opinion  19 December 2006 (19.12.2006)  Telephone No. 571-273, 7453	Name and mailing address of the ISA/ US	Date of complete	ion of this	Authorized officer
P.O. Box 1450 Alexandria, Virginia 22313-1450  19 December 2006 (19.12.2006)  Telephone No. 571-273, 7453	Mail Stop PCT, Attn: ISA/US			n = 1
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	Alexandria, Virginia 22313-1450	19 December 20		Telephone No. 571-272-7453
Facsimile No. (571) 273-3201 (Sorm PCT/ISA/237 (cover sheet) (April 2005)	Form PCT/ISA/237 (cover sheet) (A = il 200	)5)		/

International application No.

PCT/US04/40442

Box No	. 1 Basis of this opinion
1. With r	egard to the language, this opinion has been established on the basis of:
<u> </u>	the international application in the language in which it was filed
<del></del>	a translation of the international application into, which is the language of a translation furnished for the purposes of
	international search (Rules 12.3(a) and 23.1(b)).
2. With claime	regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the d invention, this opinion has been established on the basis of:
a.	type of material
	a sequence listing
	table(s) related to the sequence listing
b.	format of material
	on paper
	in electronic form
c.	time of filing/furnishing
	contained in the international application as filed.
	filed together with the international application in electronic form.
	furnished subsequently to this Authority for the purposes of search.
3.	In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additi	onal comments:
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Form PCT/ISA/237(Box No. 1) (April 2005)

International application No. PCT/US04/40442

Box No. V Reasoned statement under Rule applicability; citations and expla	43 bis.1(a)(i) with regard to now nations supporting such statemer	elty, inventive step or industrial
1. Statement		
Novelty (N)	Claims <u>NONE</u> Claims <u>1-19</u>	YES NO
Inventive step (IS)	Claims NONE Claims 1-19	YES
Industrial applicability (IA)	Claims <u>1-19</u> Claims <u>NONE</u>	YES
2. Citations and explanations: Please See Continuation Sheet		
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Form PCT/ISA/237 (Box No. V) (April 2005)

International application No. PCT/US04/40442

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#### V. 2. Citations and Explanations:

Claims 1-10 lack novelty under PCT Article 33(2) as being anticipated by Ratnakar (US Patent 6,574,372 B2).

Regarding claim 1, Ramakar discloses a method comprising:

- a) Providing a block of IWT (integer wavelet transform) coefficients for at least one frequency sub-band of an image (inherent feature upon the output of a wavelet);
- b) determining a mean value (or "D C coefficient" in col. 8, lines 55,56) of said coefficients within said block;
- c) establishing an encoded mean value (via fig. 2,num. 24) to embed one of a logical-0 bit value and a logical-1 bit into said first block (the remaining limitation is not given patentable weight since the an active step of embedding has not be claimed; thus the remaining limitation is interpreted as intended use).

Regarding claim 2, Ramakar discloses the of claim 1 wherein said establishing comprises:

Form PCT/ISA/237 (Supplemental Box) (April 2005)

International application No. PCT/US04/40442

### WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

#### Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

a) maintaining said mean value unchanged (via a "los sless" in the abstract method which is interpreted that the DC value is unchanged to the lossless method that retains values and not loses the values) to embed a logical-0 value into said block (see claim 1 with respect to intended use).

Regarding claim 3, Ramakar discloses the method of claim 1 wherein said establishing comprises:

a) changing said mean value (via fig. 7,num. 33) to embed a logical-1 bit value into said block (see claim 1 with respect to intended use).

Regarding claim 4, Ramakar discloses the method of claim 1 further comprising:

 a) not using modulo-256 addition (since Ratnakar does not disclose using modulo-256 addition, Ratnakar is interpreted to not use modulo-256 addition as claimed).

Regarding claim 5, Ramakar discloses the method of claim 1 further comprising:

a) avoiding truncation of grayscale values (since Ramakar does not disclose avoiding truncation of grayscale values, Ramakar is interpreted to avoid truncation since Ramakar does not disclose truncation).

Regarding claim 6, Ratnakar discloses the method of claim 1, further comprising:

a) correcting any erroneous bit arising from said establishing using error code correction (or "re ducing...error" in col. 8, line 47).

Regarding claim 7, Ratnakar discloses the method of claim 1, further comprising:

- a) identifying a distribution of grayscale values (or "classifies each block [with "intensities" in col. 3, line 41] " in col. 3, line 37) of pixels in a spatial-domain block affected by said IWT coefficients; and
- b) customizing said establishing (via a constant code length of "11 bits" in col. 8, line 60) according to said grayscale-value distribution.

Regarding claim 8, Ramakar discloses the method of claim 1 wherein said

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International application No. PCT/US04/40442

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

IWT coefficients comprise:

LL1 coefficients (inherent feature of wavelets as disclosed in Ramakar).

Regarding claim 9, Ramakar discloses the method of claim 3 wherein said changing comprises:

a) shifting at least one coefficient of a block in HL1 sub-band by a shift quantity (or "s hift...by 2...[or shift]...by 5" in col. 15, line 47 tool. 16, line 2).

Regarding claim 10, Ramakar discloses the method of claim 9 wherein said changing further comprises:

a) shifting at least one coefficient of an associated block in an LL1 sub-band by about one quarter (or shift "by 5 inste ad of 7" in col. 16, line 2 or shift "2 instead of 4" in col. 16, line 1 is interpreted as the claimed about (emphasis added) one quarter) of said shift quantity.

Claims 11-19 lack novelty under PCT Article 33(2) as being anticipated by Donescu (US Patent 6,633,652 B1).

Regarding claim 11, Donescu discloses a method, comprising:

- a) dividing IWT (integer wavelet transform) coefficients for at least one frequency band of an image into a plurality of non-overlapping blocks (as shown in fig. 8);
- b) determining a mean value of coefficients (as shown in fig. 19,num.
   E51) within a first block of said blocks; and
- c) modifying said mean value of said coefficients (as done in fig. 19,num. E52) to embed one or more bits of data (interpreted as intended use; see claim 1).

Regarding claim 12, Donescu discloses the method of claim 11 further comprising:

a) identifying at least one coefficient eligible for modification by said modifying and at least one coefficient to remain unchanged during said modifying (this limitation corresponds to a watermark as disclosed in Donescu's title).

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Regarding claim 13, Donescu discloses the method of claim 11 where said modifying said mean value comprises:

a) adding a shift quantity to said mean value (as shown by a "+" sign associated with a mean value "Mx" in fig. 19, num. E55).

Claim 14 is similar as claim 13. Thus, argument similar to that presented above for claim 13 is equally applicable to claim 14.

Claim 15 is addressed the same as claim 11 except for the additional limitation of:

- a) comparing said mean value (or "low frequency coefficients" in col. 6, line 31 corresponding to fig.12, label "Coefficients Yij") to a threshold (fig. 12, num. B13); and
  - b) extracting a bit value (fig. 12, num. E17) from said block based on said comparing.

Regarding claim 16, Donescu discloses the method of claim 15 wherein said extracting comprises:

a) extracting a logical-1 bit value (via fig. 12,mm. B17) from said block if an absolute value of said mean value exceeds an absolute value of said threshold (fig. 12,mm. B13).

Claim 17 lacks novelty the same as claim 16. Thus, argument similar to that presented above for claim 16 is equally applicable to claim 17.

Regarding claim 18, Donescu discloses the method of claim 15 further comprising:

a) correcting any bit error arising from said extracting employing error correction code decoding (or "che ck bit" as shown in fig. 2,num 31).

Regarding claim 19, Donescu discloses the method of claim 16 further comprising:

a) reducing the absolute value of said mean value by a shift quantity (via a minus sign, "-" in fig.

19, num. E55) used during a preceding data embedding step (fig. 19, num. E54) only if said reducing does not cause an overflow or underflow condition for grayscale values of pixels in a spatial-domain block affected by said first block (since a check for the "La st pixel?" in fig. 14, label E20 is performed that processes all pixels leaving no pixels omitted thus preventing an underflow of pixels to be examined).